WHAT IS CLAIMED IS:

1. A method for maximizing the benefits of packing and fragmentation in a communications system having a base station and at least one node, the method comprising the steps of:

receiving data packets at a base station from one or more data sources in a first or a second format;

converting the data packets in the first or second formats into data packets in a third format by packing and fragmenting the data packets in the first or second formats into data packets in the third format in a coordinated manner;

transmitting to the at least one node the data packets in the third format;

receiving the data packets in the third format in the at least one node and converting the data packets in the third format back into data packets in the first or second formats by unpacking and defragmenting the data packets in the third format; and

transferring the data packets in the first or second formats to one or more users.

2. The method of Claim 1, further comprising the steps of:

providing data packets in the first or second formats to at least one node from the one or more users;

converting the data packets in the first or second formats into data packets in the third format by packing and fragmenting the data packets in the first or second formats into data packets in the third format in a coordinated manner;

transmitting to the base station the data packets in the third format;

receiving the data packets in the third format in the base station and converting the data packets in the third format back into data packets in the first or second formats by unpacking and defragmenting the data packets in the third format; and

transferring the data packets in the first or second formats to the one or more data sources.

3. The method of Claim 2, wherein the one or more data sources can be the internet, other communications networks, data bases, or any combination thereof.

4. The method of Claim 2, wherein the one or more users are individuals or networks such as intranets, LANS, WANS, or ring-networks.

5. The method of Claim 2, wherein the third packet format is a MAC packet format.

6. The method of Claim 2, wherein the first format is IP.

7. The method of Claim 2, wherein the first packet format is ATM.

8. The method of Claim 2, wherein transmitting is via radio waves in the millimeter bandwidth spectrum

9. The method of Claim 2, wherein the data packets in the first or second formats have control information and converting the data packets in the first or second formats into data packets in the third format is further accomplished by utilizing the control information from the data packets in the first or second formats in a header portion of the data packets in the third format while storing the data packets in the first or second formats in a payload portion of the data packets in the second format.

10. The method of Claim 9, wherein some of the payload area of the data packets in the third format includes a packing subheader to indicate the length of the data packet in the first or second formats.

11. The method of Claim 9, wherein the header portion contains a plurality of fragmentation control bits to indicate the presence and orientation of fragments along with any whole data packets in the first or second formats in the payload portion.

12. The method of Claim 11, wherein fragmentation is accomplished by creating a fragment by including less than all of the data packet in the first or second formats in a corresponding data packet in the third format and by indicating this in the fragmentation control bits.

13. The method of Claim 11, wherein the plurality of fragmentation control bits comprises two bits.

14. The method of Claim 11, wherein the plurality of fragmentation control bits comprises more than two bits.

15. The method of Claim 1, wherein fragmentation and packing are done in the same layer.

16. The method of Claim 2, wherein fragmentation and packing are done by the same processor.

17. The method of Claim 12, wherein fragmentation comprises an end fragment at the beginning of the payload, a first fragment at the end of the payload or a lone continuing fragment in the payload.

18. The method of Claim 12, wherein fragmentation comprises any combination of whole data packets in the first or second formats and fragments of data packets in the first or second formats, wherein the possible combinations allowed are limited only by the number of fragmentation control bits utilized in the header portion.

19. The method of Claim 2, further comprising utilizing information regarding the packing and fragmentation as part of an algorithm for the allocation of bandwidth.

20. A method of transferring source data units between a data source and a user utilizing an intermediate communications link, the method comprising transmitting the source data units via the intermediate communications link as protocol data units, and converting the source data units to protocol data units prior to transmission by packing and fragmenting the source data units in a coordinated manner.

21. A method of improving the performance of packing and fragmentation in a packeted information communications system in which packets in a first format are converted to a third format for transmission over an intermediate wireless communications link and are then reconverted into the first format, the method comprising:

packing the packeted information in a manner responsive to the fragmentation function; and

fragmenting the packeted information in a manner responsive to the packing function.

22. A method of transmitting packets of information in a first or a second format over a communications link that utilizes packets of information in a third format, the method comprising:

converting the packets of information in either the first or second formats to packets of information in the third format prior to transmission via the communications link by packing and fragmenting the packets of information in either the first or second formats in a coordinated manner; and

utilizing information regarding the coordinated packing and fragmentation process to allocate bandwidth of the communications link to subsequent packets of information in either the first or second formats.

23. An improved method for converting incoming information packets in a first or a second format into information packets in a third format in an information communications system, the method comprising:

preparing a first information packet in the third format having a payload for storing data and a header for storing control information;

receiving an incoming information packet;

determining if the incoming information packet is smaller than the available payload in the first information packet in the third format;

storing the incoming information packet in the payload of the first information packet in the third format if the incoming information packet is smaller than the available payload in the first information packet in the third format, otherwise fragmenting the incoming information packet by storing only that amount of the incoming information packet that will fit in the first information packet in the third format in the payload of the first information packet of a third format and storing the remainder of the incoming information packet in the payload of a subsequent information packet in the third format;

updating the header of the first information packet in the third format to indicate the presence and location of an incomplete information packet if an incomplete information packet is present;

preparing a subsequent information packet in the third format having a payload and a header;

storing control information about any existing remainder of the incoming information packet in the header of the subsequent information packet in the third format;

storing any existing remainder of the incoming information packet in the payload of the subsequent information packet in the third format if the available payload is large enough to store the remainder of the incoming information packet, otherwise fragmenting the remainder of the incoming information packet by storing only that portion of the remainder of the incoming information packet that will fit in the available payload of the subsequent information packet in the third format in the payload of the subsequent information packet in the third format and storing the remainder of the incoming information packet in the payload of a subsequent information packet in the third format; and

updating the header of the subsequent information packet in the third format to indicate the presence and location of an incomplete information packet in the payload if an incomplete information packet is present.

24. A communications system that transfers information packets in a first or a second format over a communications link in a third format comprising:

a base station, the base station comprising:

a backhaul interface configured to receive the information packets in the first or second formats from at least one data source;

a base station converter configured to convert the information packets in the first or second formats to the information packets in a third format by packing and fragmenting the information packets in the first format in a coordinated manner;

a base station transmitter configured to transmit the information packets in the third format to at least one node;

the at least one node comprising;

a node receiver configured to receive the information packets in the third format;

a node converter configured to convert the information packets in the third format back to the information packets in the first or second formats

a connection interface configured to transfer the information packets in the first or second formats to one or more users.

25. The system of Claim 24, wherein;

the node further comprises:

the connection interface further configured to receive the information packets in the first or second formats from the one or more users;

the node converter further configured to convert the information packets in the first or second formats into information packets in the third format by packing and fragmenting the information packets in the first or second formats in a coordinated manner;

a node transmitter configured to transmit the information packets in the first or second formats to the base station;

and the base station further comprises;

a base station receiver configured to receive the information packets in the third format from the at least one node;

the base station converter further configured to convert the information packets in the third format back into the information packets in the first or second formats; and

the backhaul interface further configured to transfer the information packets in the first or second formats to the at least one data source.

26. The system of Claim 25, wherein the base station further comprises;

a modem configured to modulate information onto analog signals and demodulate information from analog signals;

an IF-RF module configured to convert an intermediate frequency signal to a radio frequency signal;

an antenna configured to transmit and receive radio frequency signals;

a communications processor configured to convert the information packets in the first or second formats into information packets in the third format by packing and fragmenting the information packets in the first or second formats into information packets in the third format in a coordinated manner,

and also configured to convert the information packets in the third format back into the information packets in the first or second formats; and

a backhaul interface and an input/output control both of which are cooperatively configured to provide two-way communication of the information packets in the first or second formats with the at least one data source.

27. The system of Claim 26, wherein the at least one node further comprises:

a modem configured to modulate information onto analog signals and demodulate information from analog signals;

an IF-RF module configured to convert an intermediate frequency signal to a radio frequency signal;

an antenna configured to transmit and receive radio frequency signals;

a communications processor configured to convert the information packets in the first or second formats into information packets in a third format by packing and fragmenting the information packets of a least one first format into information packets in the third format in a coordinated manner, and also configured to convert the information packets in the third format back into the information packets in the first or second formats; and

a connection interface configured to provide two-way communication of the information packets in the first or second formats with one or more users.

28. The system of Claim 27, wherein the users are individuals or networks such as intranets, LANS, WANS, or ring-networks.

29. The system of Claim 27, wherein the data packets in the first or second formats have control information and converting the data packets in the first or second formats into data packets in the third format is further accomplished by utilizing the control information from the data packets in the first or second formats in a header portion of the data packets in the third format while storing the data packets in the first or second formats in a payload portion of the data packets in the third format.

30. The system of Claim 29, wherein some of the payload area of the data packets in the third format comprises a packing subheader to indicate the length of the data packet in the first or second formats.

31. The system of Claim 30, wherein the header portion contains a plurality of fragmentation control bits to indicate the presence and location of fragments along with any whole data packets in the first or second formats in the payload portion.

32. The system of Claim 31, wherein fragmentation may be accomplished by creating a fragment by including less than the entire data packet in the first or second formats in a corresponding data packet in the third format and by indicating this in the fragmentation control bits.

33. The system of Claim 31, the plurality of fragmentation control bits comprises more than two bits.

34. The system of Claim 27, wherein fragmentation and packing are done in the same layer.

35. The system of Claim 27, wherein fragmentation and packing are done by the same processor.

36. The system of Claim 31, wherein fragmentation comprises either an end fragment at the beginning of the payload, a beginning fragment at the end of the payload or a lone continuing fragment in the payload.

37. The system of Claim 31, wherein fragmentation comprises any combination of whole data packets in the first or second formats and fragments of data packets in the first or second formats, and wherein the possible combinations and locations in the payload of whole data packets and fragments are limited only by the number of fragmentation control bits utilized in the header portion.

38. The system of Claim 27, wherein the benefits of packing and fragmentation are further maximized by utilizing information regarding the packing and fragmentation as part of an algorithm for the allocation of bandwidth.

39. A communications system for transferring incoming data packets in a first format or a second format over a communications link in data packets in a third format using a base station and at least one node comprising:

the base station comprising;

means for providing the incoming data packets to a base station from one or more data sources;

means for converting the incoming data packets into data packets in the third format by packing and fragmenting the incoming data packets in a coordinated manner;

means for transmitting to the at least one node the data packets in the third format;

the at least one node comprising;

means for receiving the data packets in the third format in the at least one node and converting the data packets in the third format back into the incoming data packets by unpacking and defragmenting the data packets in the third format;

means for transferring the incoming data packets to one or more users;

means for providing incoming data packets to at least one node from the one or more users;

means for converting the incoming data packets into data packets in the third format by packing and fragmenting the incoming data packets in a coordinated manner;

means for transmitting to the base station the data packets in the third format; and

the base station further comprising;

means for receiving the data packets in the third format in the base station and converting the data packets in the third format back into the incoming data packets by unpacking and defragmenting the data packets in the third format; and

means for transferring the incoming data packets to the one or more data sources.

40. The system of Claim 39, wherein the base station further comprises;

a modem configured to modulate information onto analog signals and demodulate information from analog signals;

an IF-RF module configured to convert an intermediate frequency signal to a radio frequency signal;

an antenna configured to transmit and receive radio frequency signals;

a communications processor configured to convert the incoming data packets into data packets in the third format by packing and fragmenting the incoming data packets into data packets in the third format in a coordinated manner, and also configured to convert the data packets in the third format back into the incoming data packets; and

a backhaul interface and an input/output control, both of which are cooperatively configured to provide two-way communication of the incoming data packets with the at least one data source.

41. The system of Claim 40, wherein the at least one node comprises:

a modem configured to modulate information onto analog signals and demodulate information from analog signals;

an IF-RF module configured to convert an intermediate frequency signal to a radio frequency signal;

an antenna configured to transmit and receive radio frequency signals;

a communications processor configured to convert the incoming data packets into data packets in the third format by packing and fragmenting the incoming data packets into data packets in the third format in a coordinated manner, and also configured to convert the data packets in the third format back into the incoming data packets; and

a connection interface configured to provide two-way communications of the incoming data packets with one or more users.

42. The system of Claim 41, wherein the data packets of the third format further comprise a header portion configured to contain one or more fragmentation control bits.

43. The system of Claim 42, wherein the data packets in the third format further comprise a payload portion for containing the incoming data packets or fragments thereof.

44. The system of Claim 43, wherein some of the payload area of the data packets in the third format comprises a packing subheader for each fragment or

incoming data packet contained in the payload portion to indicate the length of the fragment or incoming data packet.

45. The system of Claim 39, wherein the users are individuals or networks such as intranets, LANS, WANS, or ring-networks.

46. A method of transmitting a message across an information link that utilizes fragmentation and packing of packets, the method comprising:

packing a first fragment of the message at the end of a payload area of a first packet that contains one or more other messages;

filling the payload of at least one subsequent packet with a continuing fragment of the message; and

packing the last fragment of the message in the front of the payload of a last packet with one or more other messages, wherein the fragmentation and packing are performed in a coordinated manner.